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ABSTRACT

A study tested the effect of three levels of context (positive, neutral, and negative) on subjects' accuracy in identifying facial expressions of emotion (fear, disgust, anger, sadness, happiness, and surprise). The subjects were 277 female and 69 male teachers enrolled in graduate communication courses. After reading a positive, neutral, or negative context description and then viewing photographs of actors displaying four different negative facial expressions, the subjects selected one of six choices as identifying the portrayed emotion. The positive and negative contextual cues resulted in poorer accuracy for identifying facial expressions. Contrary to expectations, a neutral emotional context proved better than a negative context in facilitating the identification of negative facial expressions. Apparently, facial expressions are best identified out of context and any contextual cues confuse the meaning of the expression. Thus contextual cues may not act as choice-narrowing cues, as previous researchers have hypothesized, but as choice-widening cues in the interpretation of facial expressions. The results also provided additional support for previously identified male/female differences in identifying nonverbal facial expressions: the female subjects in this study were found to be significantly more accurate than the male subjects in identifying facial expressions. (RL)

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ACCURACY IN IDENTIFYING FACIAL EXPRESSIONS AS A FUNCTION OF COMMUNICATION CONTEXT

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ABSTRACT

This study tested the effect of three levels of context (positive, neutral, negative) on subject's accuracy of identifying facial expressions of emotion (fear, disgust, anger, sadness, happiness and surprise). Results confirmed the hypothesis that a positive emotional context resulted in poorer accuracy in correctly identifying negative expression than a neutral emotional context. The second hypothesis, that a neutral emotional context will result in poorer accuracy in correctly identifying negative facial expressions than will a negative emotional context, was not confirmed. Discussion of these results focus upon the potential for contextual information to act as choice-widening rather than choice-narrowing cues. Additional support for previously identified male/female differences in accurately identifying nonverbal facial expressions was also obtained.

ACCURACY IN IDENTIFYING FACIAL EXPRESSIONS
AS A FUNCTION OF COMMUNICATION CONTEXT

For the last century, scholars have been interested in meanings associated with facial expression. Charles Darwin (cf. 1965) observed that persons who felt particular emotions expressed them in similar fashion in all cultures. Other researchers (Birdwhistell, 1970; Klineberg, 1940) have argued that facial expressions, like languages, were specific to each culture and could not be cross-culturally communicated. However, Paul Ekman and his associates have empirically established the existence of cross-cultural, universal facial expressions (Ekman, 1972, 1973; Ekman & Friesen, 1975; Ekman, Sorenson, & Friesen, 1969). It is now widely accepted that a basic set of facial expressions has a universal meaning and is distinctly recognizable in a cross-cultural context.

Recently, research has questioned the ecological validity of the "judgment" approach that Ekman has employed in his research (Andersen & Buller, 1981). The judgment approach involves showing examples of facial expressions to individuals and determining what emotion is generally portrayed in each facial expression. Studies employing the "judgment" approach typically find high levels of agreement among receivers as to what emotion is being conveyed by a particular facial expression. Agreement is generally in the 80% to 90% range within culture as well as across culture (Ekman & Friesen, 1975). As noted by Ekman (1973), the judgment approach has several problems. Should observers of facial expressions be allowed to volunteer any word to identify the emotions which correspond to particular expressions? If so, do synonyms count as correct answers? Should observers be given a list of potential emotions to associate with each facial expression? The latter approach has been employed in virtually all experiments employing the judgment approach (Ekman, 1973). In each case, observers have been provided with a list of emotions to employ in identifying each facial expression. Indeed, typically, six choices have been provided in most experiments (Ekman & Friesen, 1975).

Providing a list of emotions to observers increases experimental control and eliminates problems with open-ended responses. However, ecological validity is reduced, for in ordinary interactions, observers of facial expressions have an almost limitless set of choices regarding which emotion they are viewing. Of course, other cues may act to narrow the potentially available options. These choice-narrowing cues may include, but are not limited to: knowledge of the source's mood; body movements, gestures, proxemic behaviors, or tone of voice; verbal behavior; traits of the source; and the context in which the communication is taking place.

In a recent study, Andersen and Buller (1981) demonstrated that the number of alternative choices of emotions provided to receivers is inversely related to the accuracy of correctly identifying facial expressions. In other words, choice-narrowing cues increase the accuracy of correct identification of facial expressions. These results suggested that facial expressions are not inherently identifiable but rather a function of the number of logical choices available to receivers. These results both supported and qualified the previous work of Ekman and associates. The high recognition scores obtained in all conditions supported Ekman's notion that facial expressions are identified

with a high degree of accuracy. However, other cues narrow available choices, and as choices are narrowed, accuracy increases.

The Andersen and Buller (1981) experiment provided no empirical evidence for the actual manner in which receivers narrow the potential choice of emotions in real face-to-face communication. They recommend a number of variables that should be examined in future studies, including: (a) verbal behaviors accompanying facial expressions; (b) vocal cues occurring with facial expressions; (c) kinesic or proxemic cues in the limbs and body which accompany facial expressions; (d) personal knowledge or familiarity with the source and her/his facial expression; (e) the previous emotional state of the source; (f) the source's personality and communication traits; and (g) the environment or context in which the facial expression is displayed. This study is an attempt to ascertain the impact of the context in which a facial expression occurs on the accuracy of correctly identifying the facial expression.

Among the many studies which have examined nonverbal accuracy or sensitivity, several have studied contextual variables associated with the correct identification of facial expressions. The first group of studies utilized various contexts to evoke a particular facial expression. Buck (1976) videotaped persons' facial expressions while the person was viewing one of five types of emotionally loaded color slides, including: (a) sexual contexts, (b) scenic contexts, (c) pleasant contexts, (d) unpleasant contexts, and (e) unusual contexts. Similarly, Rosenthal, Hall, and Zuckerman (1978) employed four contexts (pleasnat adult-child interactions, a comedy scene, a murder scene, and an auto accident) to evoke spontaneous facial reactions from research subjects, who were subsequently used as experimental stimuli. Both of the aforementioned studies used communication contexts to create particular facial expressions rather than studying a particular facial expression in several alleged contexts.

In another type of study, Guber (1966) found that subjects who had themselves undergone an experimental condition were better able to recognize the facial expressions of others. Specifically, it was found that subjects who had experienced either shocks (punishers) or bells (rewards) were better able to determine when other subjects were experiencing shocks or bells simply by looking at the other subject's face. While this experiment also examined facial expressions and context, it did not examine if context had a direct impact on accuracy of identifying facial expressions. But it did demonstrate that an individual's experience of a particular situational context could enhance the recognition rate of correctly identified facial expressions. In a similar study of person's encoding and decoding ability, Lanzetta and Kleck (1970) asked subjects to decide whether people in a video tape were experiencing shock or no-shock conditions. Once again, this study examined context only as a means of creating expressions and did not examine if knowledge of context had a direct effect on accuracy of identifying facial expressions.

Several studies have examined combinations of facial cues and other communication cues. Shapiro (1968) studied inconsistent messages in which the face and words communicated markedly different levels of pleasantness. He found that individuals responded differentially to facial or linguistic cues, with some relying largely on one set of cues to the exclusion of the other. It was

concluded that receivers have differing trait responses which cause them primarily to select either linguistic or facial cues. Rugenthal, Kaswan, and Love (1970) examined the influence of various combinations of scripts, pictures, and voices on meanings conveyed to receivers. The visual channel, which contained facial as well as other cues, was found to account for twice as much variance in meaning as either the script or the voice. However, this study examined only positive or negative visual cues rather than the meanings associated with a wider range of facial expressions. Moreover, the pictures included other kinesic cues in addition to facial expressions.

Finally, Frijda (1958) did a study which directly addressed the effect of context on facial expressions. He paired four photos of expressions by actresses with two sets of emotional cues. Subjects were asked to describe feelings, emotional states, or anything else about the actress. While some of the results of the study were statistically nonsignificant, one significant finding emerged. Interpretations of emotions or feelings differed with the situation. These findings are somewhat difficult to interpret due to the free interpretations provided by the subjects. Nonetheless, Frijda (1969, p. 193), in his summary on the recognition of emotion, maintains:

> Expressive behavior is always perceived in context. Expressive behavior constitutes relational activity and derives most of its meaning from the fact that the reference point of movement, particularly of the glance, is given or assumed.

Frifda (1969, p. 193) goes on to describe a model of the process by which nonverbal expressions are identified.

> The process of recognition of emotion can be conceived as a two stage process: assessment of the general positional activity pattern on the basis of expression, and subsequent specification of this pattern on the basis of situational and other contextual cues.

This study is an attempt to ascertain the effect of context on the accuracy of identifying facial expressions. Specifically, it is hypothesized that when viewing a series of negative facial expressions (fear, disgust, anger, and sadness):

H_1: A positive emotional context will result in poorer accuracy in correctly identifying negative facial expressions than will a neutral emotional context.

H_2: A neutral emotional context will result in poorer accuracy in correctly identifying negative facial expressions than will a negative emotional context.

Methods

Subjects

Two hundred seventy-seven female and 69 male teachers from a large eastern state participated in this study. The subject pool was comprised of teachers from across academic levels (i.e., kindergarten, elementary, middle school, junior high school, and high school). All subjects were enrolled in graduate-level communication courses and participated voluntarily.

Measure

The measure employed in this study was an eight-item test of ability to accurately identify negative facial expressions. Negative facial expressions were employed to provide an eight-item accuracy test which would be consistent with the negative context and inconsistent with the positive context. Still black-and-white photographs of facial expressions developed by Ekman and Friesen (1975) were chosen to comprise the instrument. The stimulus photographs portrayed five female and three male actors displaying four different negative facial expressions which had been validated by Ekman and Friesen (1975) as portraying specific emotions that are widely recognized within the North American culture. The photographs by Ekman and Friesen (1975) exhibited fear (photographs 10, 12), disgust (photographs 16, 18), sadness (photographs 38, 43), and anger (photographs 24, 27). Two photographs of each of these pure emotions were combined to form the set of eight stimulus expressions employed in this study. No blended or positive photographs (e.g., anger-disgust blend, surprise-happiness blend, happiness, surprise) were utilized. The photographs were transferred to 35 mm slides to facilitate the administration of the measure to a large exerimental group. The slides were produced by a professional publication photographer.

Three scoring sheets were constructed which contained a list of the four pure emotions (anger, sadness, fear, disgust). Six spaces were provided where the subjects could indicate which emotion they thought was communicated by each facial expression. The six options included the four pure emotions plus two pure emotions not depicted (happiness, surprise). The three scoring sheets differed only in terms of the situational context presented (Form 1, positive context; Form 2, neutral context; Form 3, negative context; see Table 1). Additional demographic questions were included on the measure; however, for the purpose of this study, only data pertaining to sex and responses to the list of emotions were included in this study (see Table 2).

Procedures

One of the three scoring sheets was randomly assigned to each subject. The experimenters explained that the test was designed to see how well people could determine emotional states via facial expressions. Each subject was instructed to read the context description prior to viewing the slides and then for each photograph to choose which emotion was depicted in each slide. Subjects were instructed to view each slide and then indicate the emotion, from the list of six alternatives, which they felt best described the facial

expression exhibited by the stimulus face in that specific context. No interaction among subjects was permitted during the experiment.

The eight slides were then projected in random order to the subjects. Each slide was projected for 10 seconds. Subjects were given an additional five seconds in order to mark their choice before the next slide was presented. There was no discussion between the experimenters and subjects during the viewing of the slides. Subjects were debriefed following data collection.

Variables

The independent and assigned variables for this study were: (a) sex of the subject, and (b) the three context conditions (positive, neutral, negative) presented to the subject. The analysis employed data derived from subjects' responses to the stimulus slides.

The dependent variable in the analysis was the percentage of correctly identified facial expressions. The measurement scale and scoring procedures were consistent with previous studies (Andersen & Buller, 1981; Ekman & Friesen, 1975). The measurement instrument had a split-half reliability of .40. Although low, the split-half reliability of the measurement and the obtained significant differences for sex on sensitivity to facial displays of emotion conform to previous research (Andersen & Buller, 1981; Ekman & Friesen, 1975) and will be discussed later in this papere

Statistical Analysis

A one-way analysis of variance was applied to the data to determine the accuracy level of subjects' scores on the facial expression measurement. A two-way analysis of variance for unequal cell size (sex by three context conditions) was applied to the data to identify significant sex differences across the context conditions. Alpha was set at .05. The experiment had a corresponding power of approximately .38 for small effects, .99 for medium effects, and in excess of .995 for large effects (Cohen, 1977).

Results

Hypothesis 1 was confirmed. A positive emotional context ($\bar{x}$ = 5.63) resulted in poorer accuracy in correctly identifying negative expression than a neutral emotional context ($\bar{x}$ = 6.30, $F = 12.47$; see Table 3).

Hypothesis 2 was not confirmed. Indeed, the means were in the opposite direction of the hypothesis. Means for the neutral emotional context (6.30) were actually higher than the means for the negative emotional context (5.70).

Discussion

It was expected that a negative emotional context would facilitate correct identification of negative facial expressions. This should be manifested in lower accuracy score for the neutral emotional context than the negative emotional context, as posited in Hypothesis 2. This was not the case. Similarly, it was expected that a positive emotional context would inhibit correct identification of negative facial expressions. This should be manifested in a lower accuracy score for the positive emotional context than the neutral emotional context, as posited in Hypothesis 1, which was confirmed.

The data indicate a pattern somewhat different from what was expected. In this experiment, contextual cues of either a positive or a negative type resulted in poorer accuracy of identifying facial expressions. These data seem to indicate that facial expressions are best identified out of context and that any contextual cues confuse the meaning of the expression, resulting in lower accuracy scores. Contrary to the suggestion of Birdwhistell (1970, p.29) and Andersen and Buller (1981), contextual cues may not act as choice-narrowing cues in the identification of facial expressions. Instead, contextual cues may actually widen the possible interpretations of meaning in any facial expression.

Although the reliability of the dependent measure (accuracy scores) was marginally adequate (.40), it was sufficiently reliable to pick up the sex differences consistently reported by a host of other researchers (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). These studies have indicated that females are more sensitive to nonverbal cues, particularly those which are visually received. In this study, females ($\bar{x}$ = 5.99) were found to be significantly more accurate in identifying facial expressions ($F = 9.58$, $eta^2 = .025$) than were males ($\bar{x}$ = 5.49). Although less than 3% of the variance in accuracy was a function of sex, these findings provide evidence for the validity of the accuracy test, because of its consistency with previous research.

Many choice-narrowing cues are discussed by Andersen and Buller (1981) and listed at the beginning of this paper. It is evident from these data that context can act as a confusing, choice-widening cue rather than a choice-narrowing cue. These data indicate that both consistent and inconsistent contexts may act to confuse and widen the choices in emotions that receivers see in facial expressions. Future research should manipulate contexts in other ways to ascertain if this is a general effect of context or if some contextual cues can actually narrow choices and result in more accuracy in identifying facial expressions. Moreover, a recent study by Leathers and Emigh (1980) indicates that the decoders of facial expression can make finer within-class judgements regarding the meaning of facial expressions than had previously been reported. Future attempts at relating facial meaning to context should consider using these finer categories rather than the broad categories reported by Ekman and Friesen (1975) and employed in the present study.

Table 1

Stimulus Contexts
Employed in the Experiment

Form 1: Positive Contextual Induction

The following group of photographs were taken of employees of a large multinational corporation. The photos were taken immediately after each person was informed of a promotion with a sizable salary increase. Each person had also been commended for a superior service to the corporation.

For the following photographs, please indicate which emotion the person is experiencing by checking the appropriate blank.

Form 2: Neutral Contextual Induction

The following group of photographs were taken of employees of a large multinational corporation.

For the following photographs, please indicate which emotion the person is experiencing by checking the appropriate blank.

Form 3: Negative Contextual Induction

The following group of photographs were taken of employees of a large multinational corporation. The photos were taken immediately after each person was informed that they were not promoted and received no salary increase. Each person was also critized for inferior service to the corporation.

For the following photographs, please indicate which emotion the person is experiencing by checking the appropriate blank.

Table 2

Sample Research Instrument*

(1-5) Research code _____ _____ _____ _____ _____

(6) Sex M_____ F_____
(1) (2)

(7-8) Age _____

(9-10) Grade level 1-12 (0 for kindergarten, 13 for college)
_____ (If you teach more than one class, include the grade level most frequently taught)

The following group of photographs were taken of employees of a large multinational corporation.

For the following photographs, please indicate which emotion the person is experiencing by checking the appropriate blank.

	Anger	Disgust	Fear	Happiness	Sadness	Surprise
(11) Photo 1	(1)	(2)	(3)	(4)	(5)	(6)
(12) Photo 2	(1)	(2)	(3)	(4)	(5)	(6)
(13) Photo 3	(1)	(2)	(3)	(4)	(5)	(6)
(14) Photo 4	(1)	(2)	(3)	(4)	(5)	(6)
(15) Photo 5	(1)	(2)	(3)	(4)	(5)	(6)
(16) Photo 6	(1)	(2)	(3)	(4)	(5)	(6)
(17) Photo 7	(1)	(2)	(3)	(4)	(5)	(6)
(18) Photo 8	(1)	(2)	(3)	(4)	(5)	(6)

(19) ___ Number of speech communication classes taken

(20) Form 2

*This sample depicts the neutral contextual induction.

Table 3

Analysis of Variance Effect of Context
on Accuracy of Identifying Facial Expressions

Effect	SS	df	MSS	F	P	eta^2
Form	32.85	2	19.43	12.47	<.0001	.066
Sex	12.61	1	12.61	9.58	<.002	.025
Form x sex	3.06	2	1.53	1.16	NS	
Error	447.72					
Total	496.25					

Table 4

Accuracy Means by Sex and Context

Context	Males	Females	All Subjects
Positive	5.19	5.77	5.63_b
Neutral	6.17	6.33	6.30_{bc}
Negative	5.11	5.82	5.70_c
Total	5.49_a	5.99_a	

Means with the same subscripts are sugnificantly different.

References

Andersen, P. A. & Buller, D. Judging the accuracy of facial expressions: A methodological inquiry. Australian Scan: Journal of Human Communication, 1981, (in press).

Birdwhistell, R. L. Kinesics and context. Phildelphia: University of Pennsylvania Press, 1970.

Buck, R. Nonverbal receiving ability. Human Communication Research, 1976, 2, 162-171.

Bugenthal, D. E., Kaswan, J. W., & Love, L. R. Perception of contradictory meanings conveyed by verbal and nonverbal channels. Journal of Personality and Social Psychology, 1970, 16, 647-655.

Cohen, J. Statistical power analysis for the behavioral sciences. New York: Academic Press, 1977.

Darwin, C. The expression of the emotions in man and animals. Chicago: University of Chicago Press, 1965.

Ekman, P. Universal and cultural differences in facial expressions of emotion. In J. K. Cole (Ed.), Nebraska symposium on motivation 1971. Lincoln, Nebraska: University of Nebraska Press, 1972.

Ekman, P. Darwin and facial expression. New York: Academic Press, 1973.

Ekman, P., & Friesen, W. V. Unmasking the face. Englewood Cliffs, New Jersey: Prentice-Hall, 1975.

Ekman, P., Sorenson, E. P., & Friesen, W. V. Pan-cultural elements in facial displays of emotion. Science, 1969, 164, 86-88.

Frijda, N. H. Facial expressions and situational cues. Journal of Abnormal and Social Psychology, 1958, 57, 149-154.

Frijda, N. H. Recognition of emotion. In L. Berkowitz (Ed.), Advances in Experimental Social Psychology, 1969, 4, 167-223.

Guber, G. Recognition of human facial expressions judged live in a laboratory setting. Journal of Personality and Social Psychology, 1966, 4, 108-111.

Klineberg, C. Social psychology. New York: Holt, 1940.

Lanzetta, J. T., & Kleck, R. E. Encoding and decoding of nonverbal affect in humans. Journal of Personality and Social Psychology, 1970, 16, 12-19.

Leathers, D. G. & Emigh, T. H. Decoding facial expressions. A new test with decoding norms. Quarterly Journal of Speech p. 80, 66, 418-436.

Rosenthal, R., Hall, J. A., DiMatteo, M.R., Rogers, P. L., & Archer, D. Sensitivity to nonverbal communication: The PONS test. Baltimore: John Hopkins University Press, 1979.

Rosenthal, R., Hall, J. A., & Zuckerman, M. The relative equivalence of senders in studies of nonverbal encoding and decoding. Environmental Psychology and Nonverbal Behavior, 1978, 2, 161-166.

Shapiro, J. G. Responsivity to facial and linguistic cues. Journal of Communication, 1968, 18, 11-17.